

# **Lunar-Based Research and Education**

- **What are the opportunities?**
- **How do they relate to others on Earth or ISS?**
- **How might they be developed and by whom?**
- **How would they be implemented?**
- **How could they be made massively participatory?**

# Opportunities

- **Imaging (e.g., Japan/U.S. Collaboration on GRAIL MoonKam, Earth observation w/atmospheric evaluation)**
- **Robotics (exploration, education, participating, enabling, controlling, surface & mission operations)**
- **Resource Utilization (energy, food, fuel, materials)**
- **Payload Development & Demo Validation (lunar & planetary, UH-Manoa, other partners, piggyback on Google X prize)**
- **Access & support at PISCES test sites for wide range of users (ground-truthing for exploration systems & science payloads)**
- **Integration of existing & future data sources**
- **K-12 education (web-based education modules (e.g., SpaceClass), space camps, etc.)**
- **Life Sciences/Human Factors (e.g., biotech, GeneSat, agriculture in remote & harsh environments)**
- **Energy (solar, geothermal, tests & demos)**
- **Media & Art (space art, science fiction, culture, “Island Earth”)**
- **Governance, Political Science, Law**

# **Massively Participatory**

- **Competitions**
- **Social Networking (Viralization)**
- **Media (TV, News, Inreach, Outreach, Education)**
- **Focus Groups (Kids, Parents, Teachers, Other Stakeholders)**
- **Cultural Advisory Board**
- **K-12 Educational Outreach (e.g., SpaceClass, MoonKam)**
- **Collaborative Design and Data Analysis Environments in Virtual Space**
- **Missions in Virtual Space**
- **Curricula and Certificate/Degree Programs**
- **Finding and Recruiting Partners**
- **Museums, Science Centers & Exploratoriums**
- **Space, Engineering & Robotics Camps**
- **Open Educational Forums and Blogs**
- **Exploration Uplink (e.g., rover control at PISCES or on Moon)**
- **MoonZoo.org**

# **Implementation**

- **Identify Stakeholders (now)**
  - **JUSTSAP**
  - **UH and Other Universities (thru USRA)**
  - **Hawaii Legislature and Admin thru OAD**
  - **Other States & Space/Science Related Agencies**
  - **NASA**
  - **JAXA, JSF, CSA, DLR, ESA and International**
  - **NSF, DOE & Other Federal Agencies**
  - **DoEd (Hawaii & Fed?)**
  - **Space Industry (Primes & NewSpace)**
  - **Other Key Partners (Caterpillar, Battelle, ASTEC, FREDNET, individual entrepreneurs)**
- **Form Steering Committee (December)**
- **Develop Strategic Plan & Timeline**
  - **Executive Summary to Legislature by January 2011**
- **Secure Funding**
  - **State: 7/2011, NASA SAA: 10/2011, Philanthropic Individuals and Organizations: 2012-2014)**
- **Start First Programs (2011-12)**